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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

KIM, TAE JUN

ART UNIT

PAPER NUMBER

3746

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/718,184	LEHTINEN, JEFFREY R.	
	Examiner	Art Unit	
	Ted Kim	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-18 and 26 is/are allowed.
- 6) ☒ Claim(s) 1-5, 8, 9, 11-14 and 19-26 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 04/10/2006 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 24 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 24 "said another spherical surface" lacks proper antecedent basis for this limitation in the claim. The previous claims only reference "at least one ... curved surface portion includes at least a portion of a spherical surface portion.

Drawings

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of claims 3, 5, 7, 21 must be shown (see also page 10, lines 23 and following of the specification) or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-5, 8, 9, 11-13, 19-22, 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Korzendorfer et al (6,098,407). Korzendorfer et al teach in a fuel injector assembly, for dispensing fuel in the combustion chamber of a gas turbine engine, having a contoured outer housing 38, attached on one end to an engine casing, fully enveloping a contoured deformable fuel feed 42, fixedly attached at one end thereof to a housing inlet (near 36) and having a nozzle tip assembly operatively connected therewith at another end, attached at a housing outlet end of 38, said fuel feed being otherwise separated from said housing by a peripheral insulating space 46, wherein the improvement comprises: a. said housing outlet end having a first contoured surface portion near 98; and b. said nozzle assembly including a movable nozzle spray-tip 52 having a second contoured surface portion near 98 in complementary mating engagement with said housing first contoured surface portion, resulting in relative motion therebetween upon the operation of said gas turbine engine, as a result of the thermal expansion differential arising due to the differing temperatures of said housing and said fuel feed (see col. 5, lines 7-14); wherein said first and second contoured surface portions are interior and exterior contoured surfaces [of their own elements]; wherein said first and second contoured surface portions are interior and exterior contoured surfaces, respectively [with respect to

each other]; wherein said contoured surface portions are curved (cylindrical; wherein said housing outlet end further includes a shroud 38, with said shroud including said first contoured surface portion; wherein said contoured surface portions include a curved portion (cylindrical); wherein said housing outlet end further includes an adaptor member 52, interposed between said housing outlet end and said shroud, said adaptor member including a further contoured surface portion; wherein said nozzle spray-tip exterior surface portion is in complementary mating engagement with both of said first and further contoured surface portions; wherein said first and further contoured surface portions are also axially movable relative to each other. An improved fuel injector assembly, for use in an engine, including a curved outer housing 38, fixedly retained on one end at an engine casing, fully enclosing a curved metal fuel feed member 42, said feed member being affixed at an outer end to a housing inlet end and having a nozzle assembly operatively connected therewith at an inner end thereof, said nozzle assembly being yieldingly attached at a housing outlet end, said fuel feed member 42 being otherwise spaced from said housing via a peripheral insulating space 46, said improvement comprising: a. said housing outlet end including at least one shaped surface portion (near 98); and b. said nozzle assembly including a movable nozzle spray-tip having another shaped surface portion complementarily matingly conforming with and being in contact with said at least one shaped surface portion (near 98), resulting in relative motion therebetween upon the operation of said engine, as a result of the thermal expansion differential arising due to the differing temperatures of said housing and said

fuel feed member (see col. 5, lines 7-14); wherein each of said shaped surface portions is at least partially curved; wherein said first and second contoured surface portions are interior and exterior contoured surfaces [of their own elements]; wherein said first and second contoured surface portions are interior and exterior contoured surfaces, respectively [with respect to each other]; wherein said at least one curved surface portion includes a second curved surface portion, with said at least one and second curved surface portions also being axially movable relative to each other.

8. Claim 1-5, 8-9, 11-14, 19-22, 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Scalzo et al (4,850,196). Scalzo et al teach in a fuel injector assembly, for dispensing fuel in the combustion chamber of a gas turbine engine, having a contoured outer housing 34, attached on one end to an engine casing, fully enveloping a contoured deformable fuel feed 32 (inherently deformable, including by thermal expansion), fixedly attached at one end thereof to a housing inlet and having a nozzle tip assembly 54 operatively connected therewith at another end, attached at a housing outlet end 62, said fuel feed being otherwise separated from said housing by a peripheral insulating space 58, wherein the improvement comprises: a. said housing outlet end having a first contoured surface portion 68; and b. said nozzle assembly including a movable nozzle spray-tip having a second contoured surface portion 56 in complementary mating engagement with said housing first contoured surface portion, resulting in relative motion therebetween upon the operation of said gas turbine engine, as a result of the thermal expansion differential arising due to the differing temperatures of said housing and said

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fuel feed (see fig. 3); wherein said first 68 and second 56 contoured surface portions are interior and exterior contoured surfaces [when interpreted as the surfaces of each piece, 68 is an interior surface relative to the outlet end, 56 is an exterior surface of the fuel tube], respectively; wherein said first 68 and second 56 contoured surface portions are exterior and interior surfaces [relative to each other], respectively; wherein said contoured surface portions are curved (cylindrical); wherein said contoured surface portions are curved; wherein said housing outlet end further includes a shroud 62, with said shroud including said first contoured surface portion; wherein said contoured surface portions include a curved portion; wherein said housing outlet end further includes an adaptor member, interposed between said housing outlet end and said shroud [e.g. the threaded portion 49, alternately, see below], said adaptor member including a further contoured surface portion; wherein said first and further contoured surface portions are also axially movable relative to each other. An improved fuel injector assembly, for use in an engine, including a curved/cylindrical outer housing 34, fixedly retained on one end at an engine casing, fully enclosing a curved metal fuel feed member 48, said feed member being affixed at an outer end to a housing inlet end and having a nozzle assembly operatively connected therewith at an inner end thereof, said nozzle assembly being yieldingly attached at a housing outlet end, said fuel feed member being otherwise spaced from said housing via a peripheral insulating space 58, said improvement comprising: a. said housing outlet end including at least one shaped surface portion 68; and b. said nozzle assembly including a movable nozzle spray-tip having another shaped

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surface portion 56 complementarily matingly conforming with and being in contact with said at least one shaped surface portion, resulting in relative motion therebetween upon the operation of said engine, as a result of the thermal expansion differential arising due to the differing temperatures of said housing and said fuel feed member; wherein each of said shaped surface portions is at least partially curved; wherein said at least one curved surface portion is an interior surface portions and said another curved surface portion is an exterior surface portion; wherein said at least one curved surface portion is an exterior surface portion and said another curved surface portion is an interior surface portion; wherein said at least one curved surface portion includes a second curved surface portion, with said at least one and second curved surface portions also being axially movable relative to each other.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-5, 8-9, 11-14, 19-22, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laing et al (6,718,770) in view of either Scalzo et al (4,850,196) or Korzendorfer et al (6,098,407). Laing et al teach in a fuel injector assembly, for dispensing fuel in the combustion chamber of a gas turbine engine, having a contoured

outer housing 32, attached on one end to an engine casing, fully enveloping a contoured deformable fuel feed 62, fixedly attached at one end thereof to a housing inlet and having a nozzle tip assembly 12 operatively connected therewith at another end, attached at a housing outlet end, said fuel feed being otherwise separated from said housing by a peripheral insulating space, wherein the improvement comprises: a. said housing outlet end having a first contoured surface portion 202; and b. said nozzle assembly including a nozzle spray-tip 59 having a second contoured surface portion in complementary mating engagement with said housing first contoured surface portion. It is not clear whether the first and second complementary surfaces move relative to each upon the operation of said gas turbine engine as a result of the thermal expansion differential arising due to the differing temperatures of said housing and said fuel feed, although Laing et al do teach that the fuel injector does accommodate thermal expansion and reduces thermal stresses (col. 8, lines 30+) as well as the nozzle tip assembly being easily inserted and withdrawn for assembly/disassembly (col. 6, lines 66+ and following). Scalzo et al and Korzendorfer et al, reference above for their precise teachings, each teach making a movable nozzle within second contoured surface portion in complementary mating engagement with the housing outlet end first contoured surface portion, in order to better accommodate thermal expansion. It would have been obvious to one of ordinary skill in the art to employ a movable joint at the claimed location, in order to better accommodate the thermal stresses within the fuel nozzle.

11. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over any of the art, as applied above, and further in view of Pidcock et al (4,693,074). The prior art teach a slidable connection but do not teach at least one of the curved surface portions being a portion of a spherical surface. Pidcock et al teach one of ordinary skill in the art the equivalence of using a mating cylindrical surfaces, see Fig. 6, with a part spherical surface on 96 and a cylindrical surface for 98. It would have been obvious to one of ordinary skill in the art to employ a part spherical surface for one of the sliding cylindrical surfaces as an equivalent structure for accommodating thermal expansion.

Allowable Subject Matter

12. In light of the newly cited references, the previously indication of allowability to the claims treated above has been withdrawn.

13. Claims 6, 7, 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. Claims 15-18, 26 are allowed.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax number for the organization where this application is assigned is 571-273-8300.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg, can be reached at 571-272-4828. Alternate inquiries to Technology Center 3700 can be made via 571-272-3700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>



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